1. Introduction

No Deliverables

2. Plotting Color Matching Functions and Illuminants

1. Plot of $x_0(\lambda)$, $y_0(\lambda)$, $z_0(\lambda)$ color matching functions
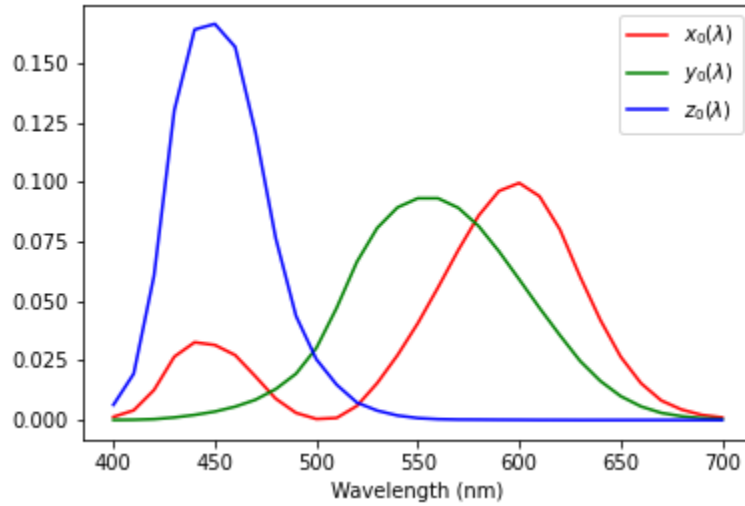

Figure 1: $x_0(\lambda)$, $y_0(\lambda)$, and $z_0(\lambda)$ vs λ

2. Plot of $l_0(\lambda)$, $m_0(\lambda)$, $s_0(\lambda)$ color matching functions
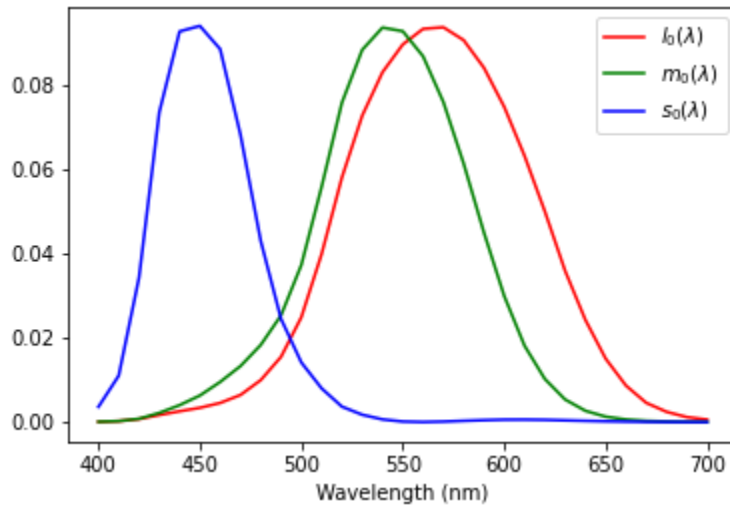

Figure 2: $l_0(\lambda)$, $m_0(\lambda)$, and $s_0(\lambda)$ vs λ

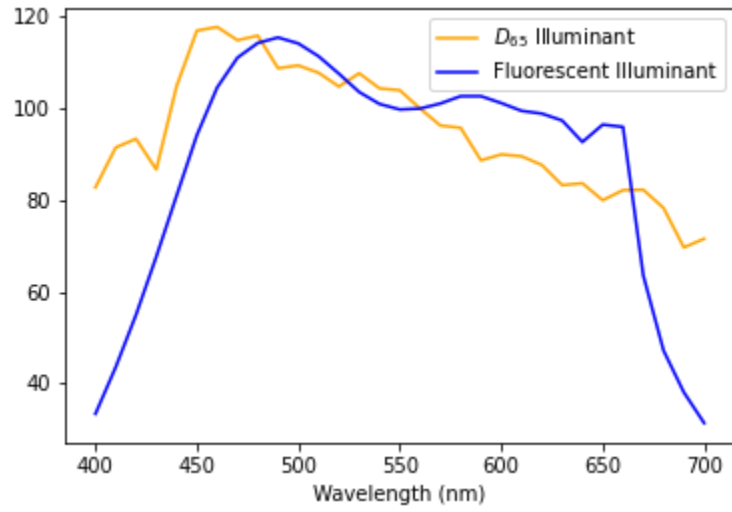3. Plot of D$_{65}$ and fluorescent illuminants

Figure 3: D$_{65}$ and Fluorescent Illuminants vs λ

3. Chromaticity Diagrams

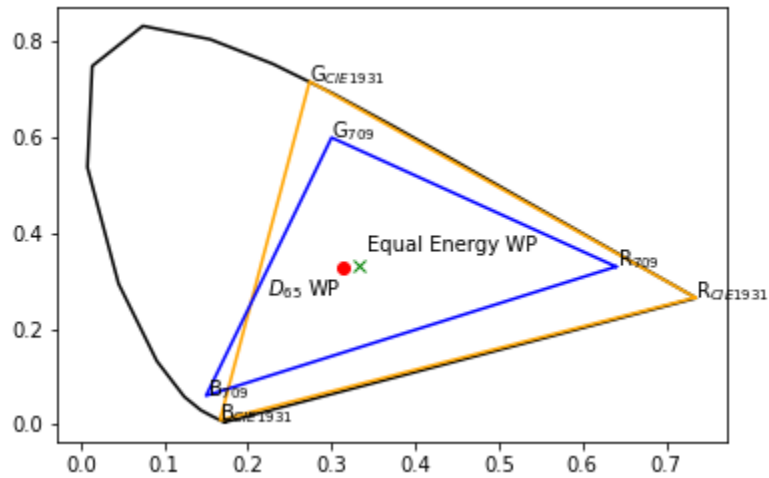1. Labeled chromaticity diagram

Figure 4: Chromaticity Diagram

4. Rendering an Image from Illuminant, Reflectance, and Color Matching Functions

1. Matrix M_{709_D65}

$$M = \begin{bmatrix} 0.4124 & 0.3576 & 0.1805 \\ 0.2126 & 0.7152 & 0.0722 \\ 0.0193 & 0.1192 & 0.9505 \end{bmatrix}$$

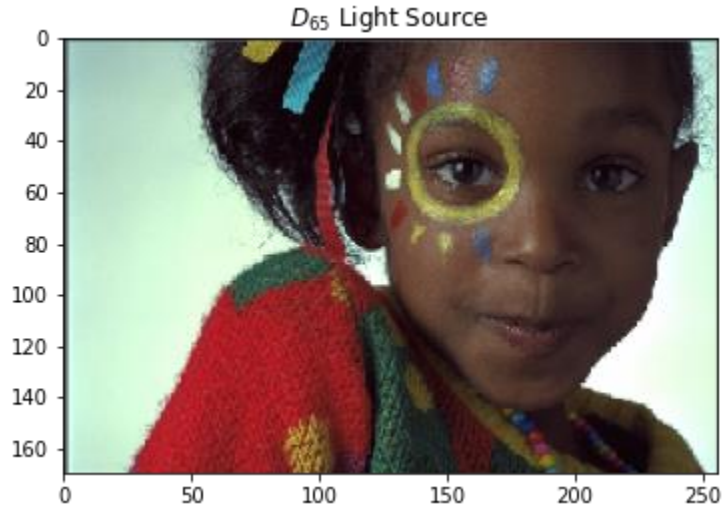2. Two images obtained from D_{65} and fluorescent light sources

Figure 5: D_{65} Light Source Image Rendering, $\gamma = 2.2$
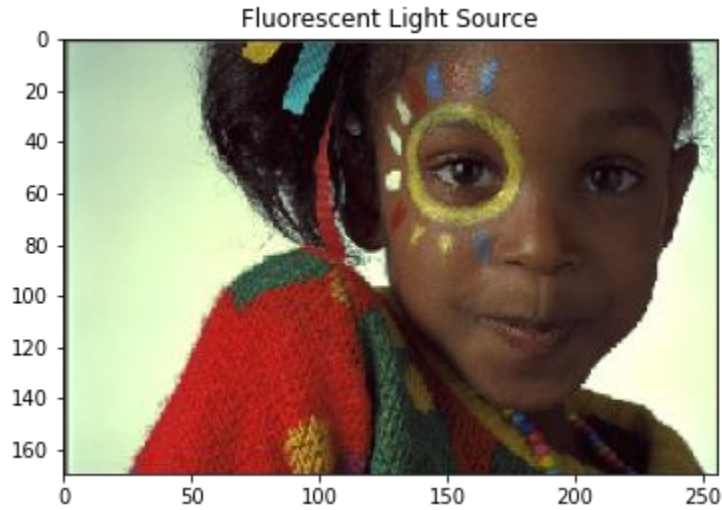

Figure 6: Fluorescent Light Source Image Rendering, $\gamma = 2.2$

3. Qualitative description of the differences between the two images

The image rendered with the fluorescent light source appears brighter than the image rendered with the D_{65} light source. As a result, the girl's skin color and background appear more vivid in the second image. In addition, the red in the second image appears slightly more saturated than in the first. Subjectively speaking, the image rendered with the D_{65} light source appears more natural to the eye, whereas the image rendered with the fluorescent light source appears somewhat artificial as if it was processed in a photo editing software.
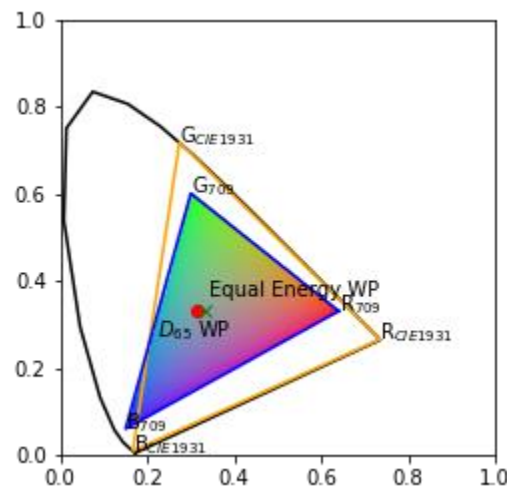
5. Color Chromaticity Diagram
1. Color diagram

Figure 7: Color Chromaticity Diagram, $\gamma = 2.2$